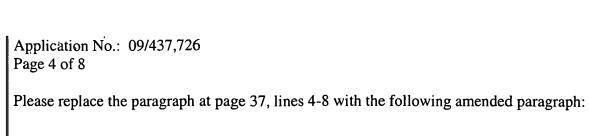
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## **Amendments to the Specification:**

Please replace the paragraph at page 35, line 15 to page 36, line 9 with the following amended paragraph:

An example of such a biosynthetic pathway enzyme is ribulose-1,5-bisphosphate carboxylase-oxygenase ("Rubisco"), which is the enzyme in plants, green algae (including marine algae), and photosynthetic bacteria involved in fixing atmospheric carbon dioxide into reduced sugars. Rubisco is a true bifunctional enzyme; it catalyzes (i) carboxylation of ribulose bisphosphate ("RuBP") to form two molecules of 3-phosphoglycerate, and (ii) oxygenation of rubp to form one molecule of 3-phosphoglycerate and one molecule of 2-phosphoglycerate, at the same active site. The oxygenation reaction catalyzed by Rubisco (also called photorespiration) is a "wasteful" process, since it significantly reduces the amount of carbon fixed. Both CO<sub>2</sub> and O<sub>2</sub> compete for the same active site, although the Km for CO<sub>2</sub> is about an order of magnitude less than for O<sub>2</sub>. In plants, as the temperature rises during the course of the day, photorespiration catalyzed by Rubisco increases relative to carbon fixation, reducing the energy efficiency of carbon fixation. This is because the solubility of CO<sub>2</sub> decreases with increasing temperature relative to O<sub>2</sub>. During the course of evolution, Rubisco has been selected for carboxylation specificity (carboxylation specificity factor defined as the ratio of maximal velocity of carboxylation x Km for O<sub>2</sub> to maximal velocity of oxygenation x Km for CO<sub>2</sub>). This specificity has evolved from about 10 in bacteria, to 50 in cyanobacteria, and to about 80 in higher plants. In photosynthetic bacteria and dinoflagelates. Rubisco is present as a dimer of a large subunit (Form II, L<sub>2</sub>), and no small subunit is present. In cyanobacteria, green algae, and higher plants (C3 and C4 plants), Rubisco is present as multimeric (e.g., hexadecimeric) protein composed of two subunits, the large (L) subunit which is catalytic, and the small (S) subunit which is regulatory, formed into an enzymatically active multimer (e.g., L<sub>8</sub>S<sub>8</sub> hexadecimer). Coding sequences for L and S subunits for various species are disclosed in the literature and Genbank, among other public sources, and may be obtained by cloning, PCR, or from deposited materials.



For illustration and not to limit the invention, examples of a desired Rubisco enzymatic phenotype can include increased RuBP carboxylase rate, decreased RuBP oxygenase rate, increased Km for O<sub>2</sub>, decreased Km for CO<sub>2</sub>, decreased ratio of Km for CO<sub>2</sub> to Km for O<sub>2</sub>, maximal velocity

for O<sub>2</sub> or CO<sub>2</sub>, and the like as described herein and as may be desired by the skilled artisan.